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This is UNEVALUATED Information

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CZECHOSLOVAKIAAIR/ECONOMICMORAVAN, Aircraft Factory, OTROKOVICE

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1. Location and layout

The Aircraft factory MORAVAN, National Corporation, is located in the bend formed by rivers MORAVA and DREVNICE, S.W. of OTROKOVICE railway station near GOTTWALDOV (see sketch map at Appendix A).

2. Production

The factory is engaged in the following:-

- (a) Construction and assembly of ZLIN 126 aircraft,
- (b) Construction of landing flaps and wheels for MIG aircraft,
- (c) Manufacture of equipment for testing hydraulic system in jet aircraft,
- (d) Testing of wheels and brakes for jet aircraft,
- (e) During 1955 buffers for railway trucks and frames for JAWA 500 motorcycles were also made there.

3. Construction and assembly of ZLIN 126 training aircraft

(a) The aircraft is assembled in the factory from components from other plants. It is a two seater low-wing monoplane with WALTER MINOR engine of 105 HP. It is equipped for military training purposes and has all necessary instruments including W/T set (receiver only). The fuselage is of metal construction covered with fabric, whilst the wings and tail parts are made of duraluminium.

(b) Instruments are supplied by various factories as follows:-

Altimeters, compasses, speedometers,  
variometers

- AERO PRAHA HOLESOVICE

Dynamos and regulators, ignition  
switches

- PAL KROMERIZ

SECRET

25X1

/Lights

SECRET

25X1

-2-

Lights and light switches - PAL (location not known)

25X1

Magnets of foreign make - [REDACTED]

Motors complete with carburettors were supplied by WALTER factory in JINONICE, but it was understood that the production would be transferred to another plant.

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Electrical instruments such as gauges, pressure gauges, instruments for flaps control, voltamperimeters etc. are supplied by AEROPAL factory in MARATICE nr. STARE MESTO NA MORAVE.

Duraluminium sheets are in very short supply and factory officials have to visit various warehouses and factories to ensure it's supply.

Undercarriages are not manufactured at OTROKOVICE but come from elsewhere - factory not known.

The W/T set in ZLIN 126 is produced by the TESLA factory in PRAGUE - HOLESOVICE. It has a range of 300 kilometres. It is a 24 volt 8 valve superhet. In the aircraft it is located behind the rear seat and controlled from the front seat. It is a receiver only so that the trainee pilot need not be distracted by also having to send. The manufacturers label bears the letters RST 6 and two more letters. The faulty sets are sent for repairs to the manufacturers as stated above.

All supplies of parts and materials arrive by rail to OTROKOVICE station and are transported to the factory by lorry.

(c) The aircraft are assembled at the Assembly Shop - a converted hangar - see Appendix A.

(d) Completed aircraft are taken over after tests at OTROKOVICE airfield, by CAF officers stationed at the airfield. There are four officers there permanently with a major in charge. They hand the aircraft over to a group of CAF officers and pilots who regularly arrive in a SIEBEL aircraft with mechanics and fly the aircraft back to CAF units.

25X1

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25X1

SECRET

-3-

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(f) The average production of ZLIN 126 aircraft is 12-15 per month, but in November and December 1955 one aircraft was produced each day in order to fulfil the plan. The total figure for 1955 was 200 - 210 aircraft, as the factory was not working at full capacity owing to shortages of materials.

(g) The prototype ZLIN 226 is being tested for towing gliders and will be supplied to SVAZARM.

4. Construction of landing flaps and wheels for MIG jet aircraft.

(a) These are made in two workshops which are located in the N.W. part of the factory area. (See Appendix 4 - buildings 21 and 22).

(b) Weekly output of flaps is 80. The plant also repairs old ones which are sent into the factory. New flaps are packed in boxes containing five each. These flaps are for MIG 15's but workers said that with slight modifications they would be suitable for MIG 17's. No such modification was made at MORAVAN. Production of wheels (complete with brake drums) averages about 30 per week and about the same number of these are reconditioned in the factory. The wheels are packed in boxes and taken away by military lorries which also collect the flaps regularly once a week. There are no markings on the packing cases but the soldiers in charge of the lorries stated on several occasions that they transport the products to RUDY LETOV factory in PRAGUE-LETNANY. The same transport brings to the factory wheels

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-4-

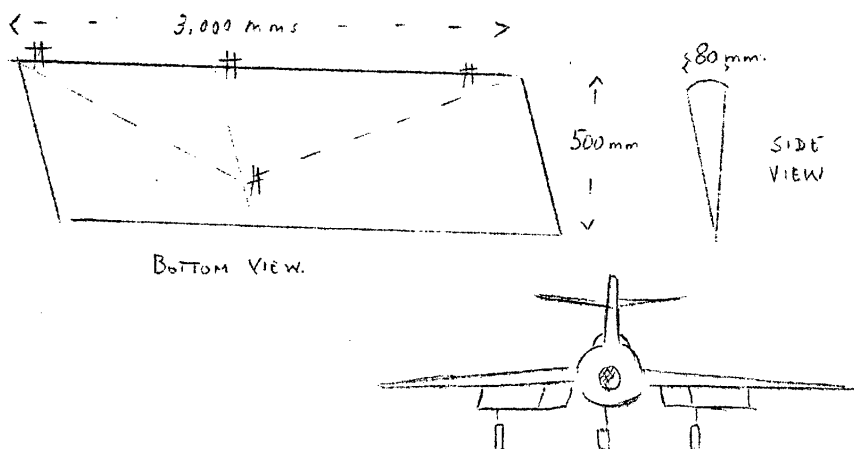
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and flaps for reconditioning.

Whilst the flaps are being produced in series the wheels are made and assembled according to orders received and material available. Three sizes of wheels are being made depending on the inner diameter of the tyre. It is not known if this is the only plant in the country producing these parts.

FLAP FOR MIG A/c.



(c) The inspection department of the factory receives every week four large packing cases each containing 380 brake wedges from the rubber factory in BRATISLAVA, where a new factory was built in 1953.

It seems that the mixture from which the wedges are made is unsatisfactory because every batch has to be tested in MORAVAN and sometimes up to 50% are rejected during testing. CAF officers working on and supervising the production of wheels often complained, saying that the brake wedges have to be replaced after an average of ten landings. The change is being done by AF units themselves and takes 15 - 20 minutes on one wheel.

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-5-

The wedges are composed of rubber, and asbestos with brass threads.  
12 such wedges are used in each brake drum.

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5. Production of equipment for testing, cleaning and refilling the hydraulic liquid in jet aircraft

(a) In July 1955 the factory started production and assembly of special trolleys with equipment for testing the hydraulic system of jet aircraft (see Appendix B). The drawings and specifications were supplied by the AF Research Institute in PRAGUE, and it was required that the instruments be assembled in such a way that they should be able to work even after an atomic attack, i.e. that everything must be air-tight, so that they could be washed after an atomic explosion with a stream of water for at least two hours without any leaks. In the end this condition was fulfilled by lining of all sides and edges with foam rubber strips. The AF authorities accepted this solution. The first batch of 80 were handed over to the Air Force in October 1955 under the supervision of the Ministry of Defence. Planned yearly production is 300; and as development work was done entirely at MORAVAN it is believed that this is the only factory producing them. In September 1955, 2,000 labels in Russian for the trolleys were received. It was rumoured that the USSR was ceasing to make them.

(b) The trolley has four hoses which are screwed in to the aircraft. The liquid (spirit-glycerine mixture and oil mixture) is kept in separate tanks and is fed into the system under pressure of 150 atm (flight controls) and 60 atm (brakes) respectively. The pressure gauges then show whether there are any leaks in the systems. By opening of the pressure valve the old liquid is then returned to the tanks.

(c) In December 1955 the trolleys were still stored in a hangar at OTROKOVICE airfield.

(d) The trolleys are painted khaki and can be either towed

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SECRET

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-6-

25X1

[ ] or manhandled. The weight of a trolley is about 300 kgs...

6. Testing of wheels for jet aircraft.

(a) In December 1955 a test-bed was established at the factory, and by January 1956 a second one was brought into operation. 25X1

Equipment for two more test-beds was available and they were to be constructed in due course.

(b) The purpose of the test is to establish the resistance of the wheel and of the tyre (not the axle) to the pressure experienced on landing. There are no regular X-ray tests for the faults in the material, and this is the only way in which wheels are tested.

Every wheel is tested in three or four places at 90 - 120 degrees apart. The test is carried out by factory inspectors under supervision of an A.F. officer. The results of the test are entered on a special form which goes with the wheel to the assembling plant.

(c) The wheel is first put onto the axle and fastened in with a nut and a pin. The axle is really the part of the testing machine because it is not produced in the factory and is supplied by the plant producing the undercarriages. (See Appendix C)

When the wheel is settled in its bed the piston comes down and the chamber is filled with liquid (hydraulically controlled). When the piston touches the wheel the control light comes on and the pressure pump is switched on automatically. The liquid is then pumped into the chamber under pressure until the reading is 160 atm. This pressure is supposed to be five times greater than the pressure experienced by the wheel on landing on a concrete runway. The pressure is kept on for several minutes. After this the operator opens a valve which lets the liquid back into the tank. The wheel is turned 90 degrees and the test is repeated in the same way. The point of the pressure is marked with white paint and a circle is also made on the wheel showing the extent of the pressure.

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(d) The  
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-7-

(d) The testing bed is surrounded by steel plates about 25 mm thick which stop the fragments in case the wheel does not stand the pressure and breaks into pieces. Some cases of this were reported but they were not very frequent. After the test the wheel goes to the stores and to the assembly department where the brakes are fitted. 25X1

7. Testing of brakes of MIG 15 aircraft (See Appendices D.E. and F.)

(a) The purpose of the test is to establish the efficiency of the brake and to check the quality of the wedges, drum and of the tube which operates the brake.

(b) The test is carried out as follows:-

The wheel complete with brake is pressed against the flywheel by weight equal to the weight of the aircraft. The electric motor is switched on to turn the flywheel and the wheel. When the speed reaches the equivalent of 800 kms per hour the brake is put on. The momentum of the brake is measured and noted on a diagram and on instruments by the way of the pressure cylinder. The tests are carried out by the factory inspectors under supervision by a CAF officer who also has to sign the results, and the test certificate. The diagram is also attached to the certificate. After the test the wheels are greased and packed into packing cases for transport to the assembly plant. For the test the tyres are filled with air, the pressure being the same as under operational conditions.

(c) Two test-beds are in operation in the factory. In January 1956 another bed was being erected in which it will be possible to test two wheels at the same time. Details of this installation are not known.

8. Labour force at MORAVAN.

The total number of employees working at the factory is approximately 500 and 100 apprentices. These are employed as follows:-

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SECRET

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-8-

Assembly of aircraft	-	25	25X1
Production of flaps			
for jet a/c	-	60 (three shifts)	
Turners	-	60	
Toolroom	-	30	
Production of wheels			
for jet a/c	-	40	
Assembly of fuselages	-	50 (two shifts)	
Design and construction			
office	-	20	
Offices	-	35 - 40	
Production of wings	-	20	
Testing and inspection	-	20	
Stores	-	25	
Castings	-	7	
Spraying and painting	-	25	
Factory guard	-	15	
Auxiliary workers	-	40 - 50	

9. Power Supply

(a) Electric power comes from the GOTTWALDOV grid. In the first months of 1955 an emergency power station was erected in the factory which can supply about 60 percent of necessary power in an emergency (Diesel generators).

(b) There is also a steam pipe-line for heating factory and accommodation which is under construction from SVIT GOTTWALDOV. SVIT has a surplus of steam.

10. Leading personalities.

(a) Factory director - SYROVY fnu, [redacted] 25X1

Chief engineer - BRDLICKA fnu, formerly director 25X1

Chief test pilot - SVAB fnu

Second test pilot - HRABEC fnu

Head of special dept. - BUCEK fnu

Head of C&F dept. - (Major) TATARKA 25X1

Head of the laboratory & testing dept. - JANECKA Oldrich. [redacted]

Besides Major TATARKA there are two other officers in the C&F department (a captain and a lieutenant). Their office is located in the canteen building on the first floor. They have not their own telephone nor teleprinter and use the factory facilities which are

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SECRET

-9-

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located in the special department office in the same building.

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The head of the special department BUCEK also has another office in the main administrative building in the factory area.

(b) The special department issues passes to the visitors to the factory and also to its own employees who are to visit sub-contractors.

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#### 11. Security

The factory area is surrounded by a wire fence about 220 cms high with four rows of barbed wire on top. Every 15 metres there are strong electric lamps which are switched on through the night. During the night two-man patrols with a watch dog belonging to the factory guard patrol inside the fence and there is another two-man patrol on duty inside the factory. The patrols have to clock in at various places according to the instructions issued daily by their commander.

#### 12. Airfield

The airfield, on which the buildings are situated, is no longer used as a communications airfield, but only by aircraft collected from the factory, and training aircraft and gliders belonging to the SVAZARM.

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Legend fo

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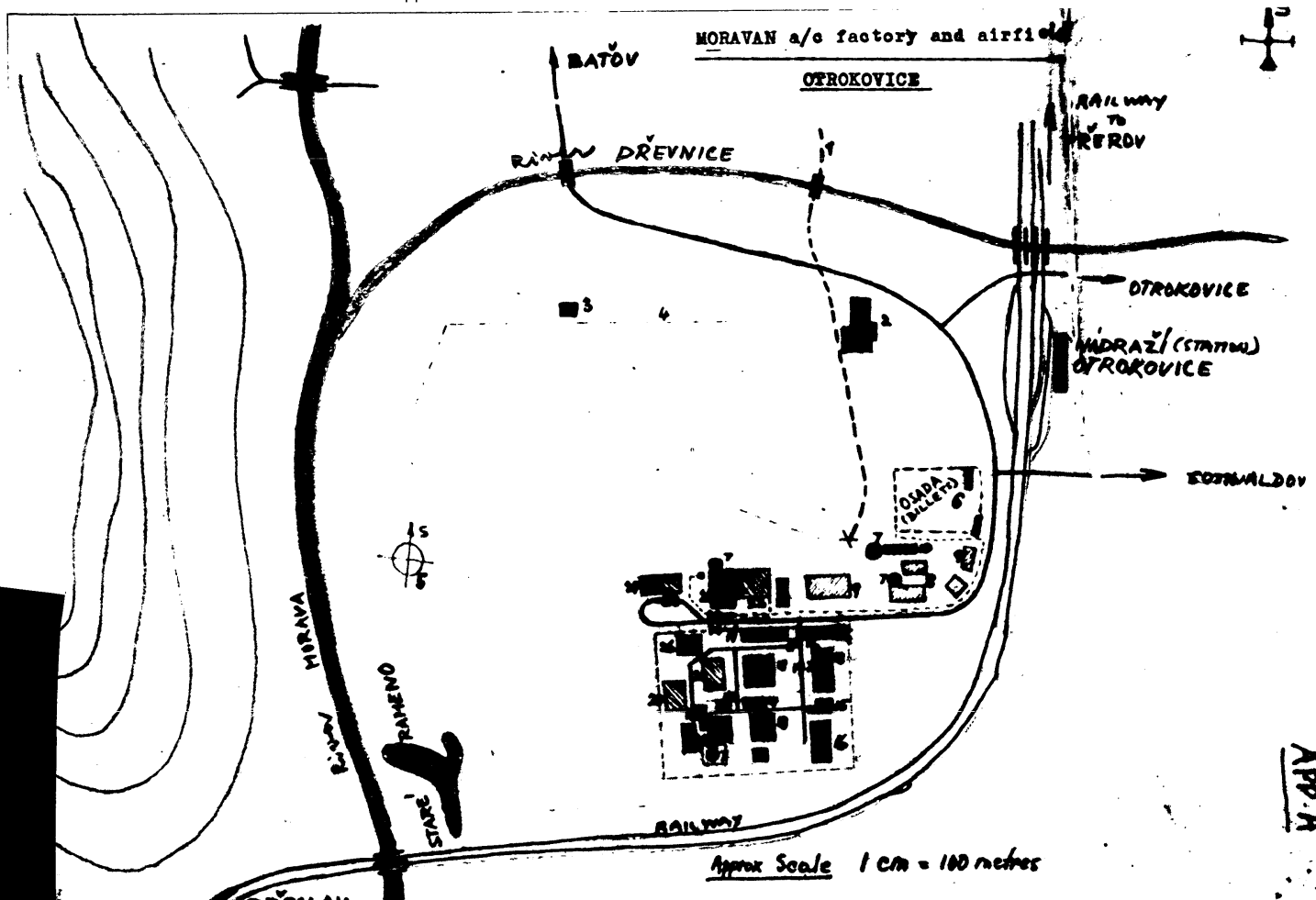
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Legend for the sketch map

- 1 - Steam pipeline
- 2 - Rubber plant SVIT
- 3 - RIF station
- 4 - Airfield area
- 5 - Compass adjusting station
- 6 - Billets
- 7 - POL stores
- 8 - SVAZARM hangars
- 9 - MORAVAN hangars
- 10 - SVAZARM office
- 11 - Main gate and Cadre Dept.
- 12 - Factory guard and fire station
- 13 - Stores, testing shop, spraying and painting shop
- 14 - Power station and transformer
- 15 - Boiler room
- 16 - Toolroom
- 17 - Admin offices
- 18 - Workshops
- 19 - Stores (three buildings)
- 20 - Testing of wheels and brakes for jet aircraft
- 21 - Production of wheels for jet aircraft
- 22 - Production of landing flaps for jet aircraft
- 23 - CAF dept., special dept., canteen on the ground floor
- 24 - Factory apprentices school, M.O. room
- 25 - Assembly shop
- 26 - Casting shop

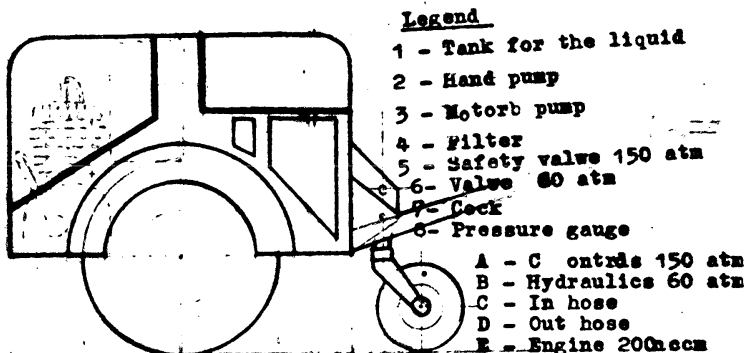
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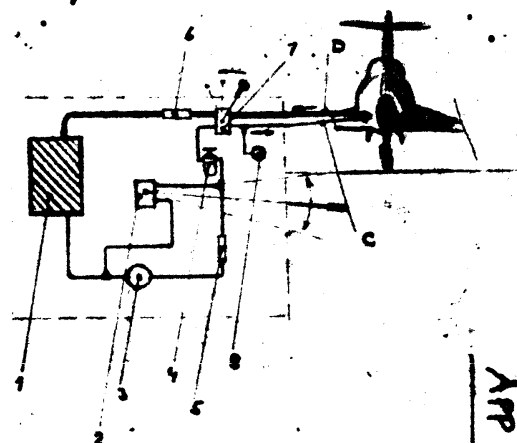
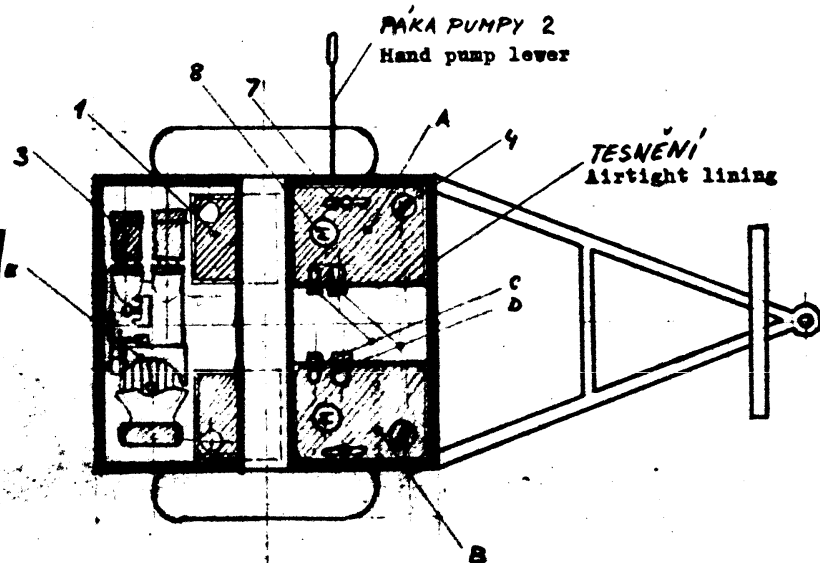
APP. R



**ZKUSEBNÍ VOZÍK HYDRAULIKY A ŘÍZENÍ**

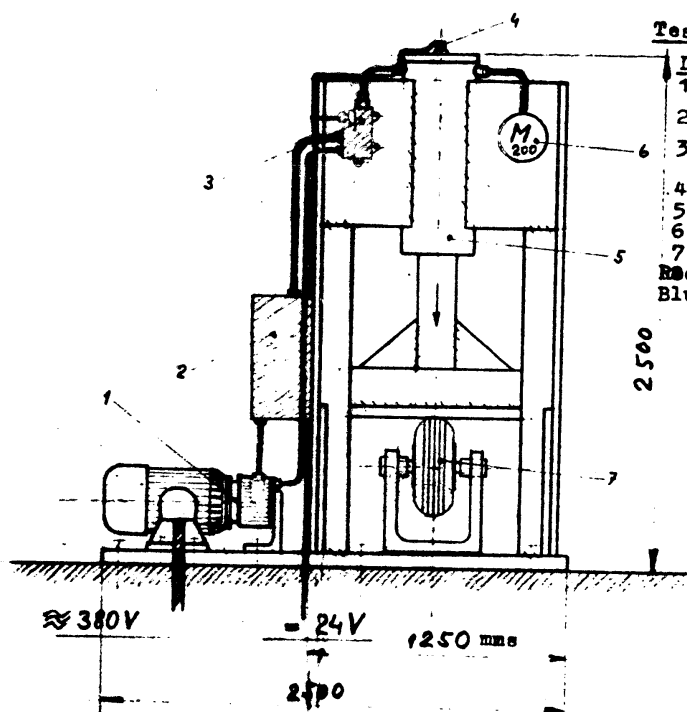
1	NÁDRŽ KAPALINY
2	RUCNÍ PUMPA
3	MOTOROVÁ PUMPA
4	KAPALINOVÝ FILTR
5	POJISTNÝ VENTIL 150 atm
6	BRZDÍCÍ VENTIL 60 atm
7	PŘEPONSTĚČÍ KOKET
8	TLAKOMĚR 150 mm
A	PRO ŘÍZENÍ 150 atm LINOVÝE SMĚS
B	PRO HYDRAULIKU 60 atm OLEJ SMĚS
C	VÝTOK SMĚSI Z VOZÍKU DO LETADLA
D	" " Z LETADLA DO VOZÍKU
E	BENZINOVÝ MOTOR 200 ccm
	PRO ZKOUSKU TĚSNOSTI A DOPLNĚNÍ SMĚS

D 04



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APP B



# Testing of jet a/c wheels

## Description:-

- 1 - Motor pump
  - 2 - Fluid tank
  - 3 - Electrically controlled valve
  - 4 - Pressure control
  - 5 - Chamber with piston
  - 6 - Pressure gauge
  - 7 - Wheel under test
- Red- Electric circuit  
Blue-Pipes

## ZKOUŠENÍ PEVNOSTI HOTOVÝCH KOL

### POPIS ZAŘÍZENÍ

- 1 MOTOR S ČERPADLEM
  - 2 NÁDRŽ TLAKOVÉ KAPALINY
  - 3 PŘEPŮSTĚCÍ VENTIL ELEKTRICKÝ
  - 4 VÝSILACÍ TLAKOMĚRU
  - 5 KOMORA S PÍSTEM
  - 6 KONTROLNÍ MANOMETR
  - 7 ZKOUŠENÉ KOLO V PŘÍPRAVKU
- ELEKTRICKÉ VEDENÍ  
— TLAKOVÉ POTRUBÍ

D 01

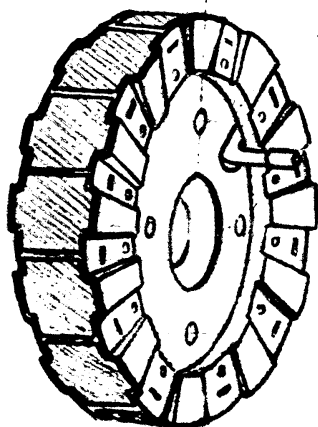
OVLAĐÁNÍ JE DÁLKOVÉ

Operated from the control room

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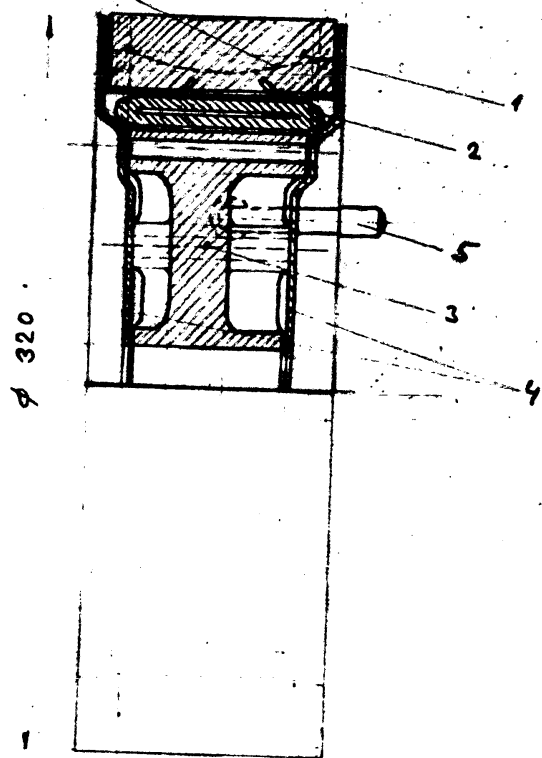
The inner tube of the wheel is filled with water before the test. DUŠE KOL PŘED ZKOUŠKOU SE PLNÍ PRO ZPEVNĚNÍ VODOU

Brakes of MIG 15 wheels



OCELOVE PERO V ZAREZU LAMELY

Steel spring in the wedge



D 05

OMPLETNI LAMELOVA BRZDA

BRZDICI SPALIK

DUSE

1 - Brake wedge

2 - Tube (Rubber)

BRZDOVY ODLITEK - LEHKA SLITINA

OCELOVE BOCNI DRZAKY LAMEL

VENTIL PRO TLAKOVOU SMEB (LINOLYK)

3 - Brake cast

4 - Steel holders

5 - Valve

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APP D

ZKOUSENÍ BRZDY A BRZDA

UVEDENÍ

UVEDENÍ

POPIS SCHEMATU  
1 ELEKTRICKÝ MOTOR  
2 KLÍNOVÉ ŘEMENY 5x  
3 SETRVAČNÍK  
4 ZKOUSENÉ KOLO A BRZDA  
5 PÁKA

6 TLAKOVÝ VALEC  
7 PÁKA  
8 PÁKA  
9 HYDRAULICKÝ ZVEDÁK  
10 ZÁVAŽÍ  
11 POD ÚROVNI PODLAHY

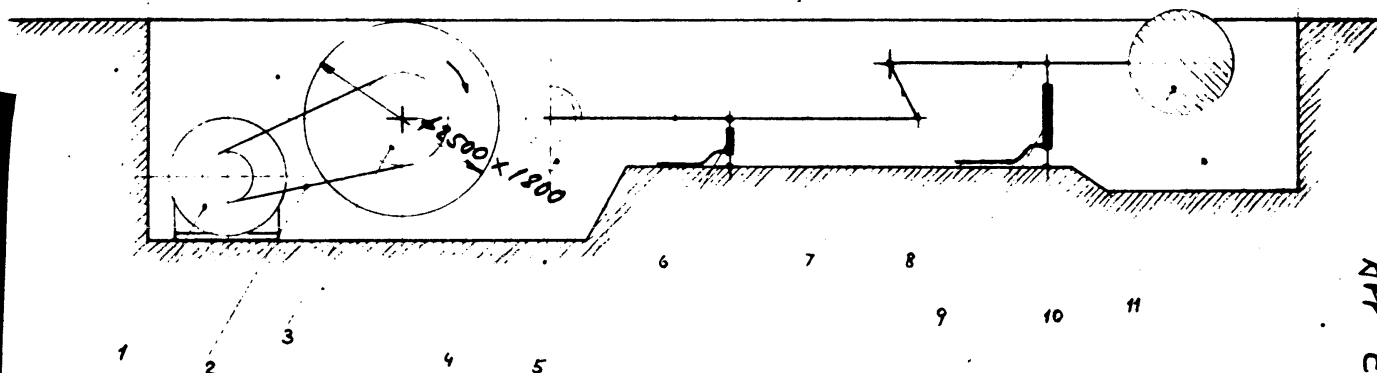
Operated from the control room

Legend

- 1 - Electric motor
- 2 - Belt (five fold)
- 3 - Fly-wheel
- 4 - Wheel with brake under test
- 5 - Lever
- 6 - Pressure cylinder
- 7) - Levers
- 8) - Levers
- 9 - Hydraulic jack
- 10 - Weight
- 11 - Testing bed

Testing of jet a/c brakes

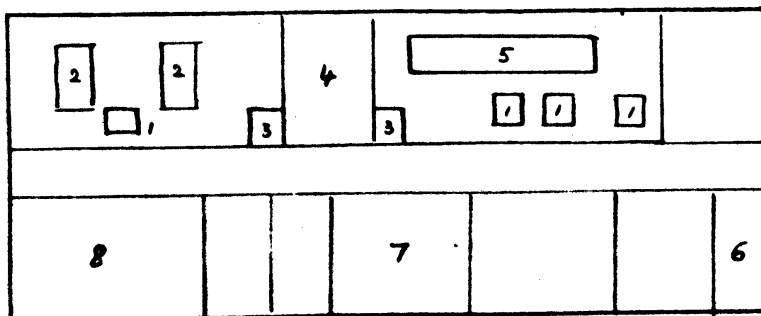
9000 mm



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APP E

Layout of the testing station for wheels and brakes  
for jet a/c at MORAVAN a/c factory OTROKOVICE  
Not to scale



Legend

- 1 - Pressure tests of wheels
- 2 - Testing of brakes
- 3- Instruments board
- 4 - Control room
- 5 - New testing bed for brakes
- 6 - Transformer
- 7 - Stores
- 8 - Assembly shop

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(Building No 20 at App A.)